The Virtual Library in the Federal Sector

Developing a Virtual Library to Support Federal Researchers

ALA Annual Conference
Federal Librarians Round Table Program
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Game Plan

Who We Are and What We Do

Virtual Library Initiatives: InfoWeb and TORPEDO

TORPEDO Input - Contents and Process [The Library Perspective]

TORPEDO Output - Search and Retrieval [The User Perspective]

InfoVision/2000 Library Study

Current Focus and Future Plans

Wrap-up and Questions

NRL Environment

Navy's Corporate Research Lab

Main Campus - Washington, D.C.

3,500 Federal Employees [1,600 Scientists and Engineers]

1,200 On-site contractors

130-acre Campus

116 Buildings

Subject Focus:

Physics, Chemistry, Electronics, Space Sciences

Other Locations:

NRL - Stennis, MS

NRL - Monterey, CA

Parent Organization:

Office of Naval Research, Arlington, VA

Library Environment

Collection

150,000-volume Research Collection - 1,200 Journal Titles

300,000 Cataloged Reports - 125,000+ Stored Electronically

Electronic Systems

Library OPAC [STILAS] and Online Reports Catalog [STAR]

InfoNet - Library-developed Campus-wide Information System for Menu-driven Desktop Access to Information.

CD-ROM and Online Databases

Preprogrammed Internet Connections

Laboratory MIS Databases

Library Catalog

InfoWeb - Library Home Page and WWW Information Gateway

TORPEDO for desktop retrieval/display of journals and reports

InfoWeb Library Home Page and Information Gateway

- URL http://infoweb.nrl.navy.mil
- Links to local and remote sites in the following subject groupings:

Catalogs and Databases	Computer Support
Government Information	Internet Directories
Library and its Services	Science Resources

- Access to TORPEDO
  (The Optical Retrieval Project: Electronic Documents Online)
- Selected for relevance and annotated to facilitate use
- Excite Search capability across all InfoWeb pages

TORPEDO

Complete Document

Provides all information in document *(Equations, Formulae, Graphs, Charts, Diagrams)*

Industry Standard Images

Delivers TIFF images for display and printing and uses OCRed text for searching.

Commercial Off-the-Shelf (COTS) software

Excalibur uses patented Fuzzy Search algorithm to enhance retrieval

WWW Interface

Uses standard graphical Web Browser and freely-available TIFF viewer.

TORPEDO: WWW Access to Journals and Research Reports

Journal(s)	# of Documents	Coverage
EES (Elsevier)	13,600+	1995 to date -140 journals
NRL Press Releases	1,900+	1968 to date
Physical Review E	5,000+	January 1993 to date
Physical Review Letters	6,300+	January 1994 to date
Technical Reports	1,900+	1943 to present
Coming Soon:		
NIST Journal of Research		1987 through 1996

TORPEDO: Research Reports

Reports Imaging System - started in 1989

125,000 Unclassified Reports (7,000,000 Pages) from Library collection, digitized as space saving measure.

Currently scanning 10,000 pages/day (1,000 reports/week).

Linked to Cuadra STAR catalog with Genesys ImageXtender.

TORPEDO Technical Reports

Reports w/o distribution restrictions being added to TORPEDO.

Page images OCRed to create full text searchable database.

Brief Bibliographic records imported from STAR for field searching.

APS-NRL Journal Experiment

Agreement Between NRL and the American Physical Society

Focus: Electronic Dissemination of Current APS Journals

Physical Review Letters *Physical Review E*

Format:

Unbound Paper Copies

Sent by Overnight Mail from Printer

Scanned and OCRed by Library

Availability:

Scanned journals available to NRL Users at their desktops within 24 hours

Elsevier Electronic Subscriptions [EES]

Electronic version of traditional print journals

Follow-on of TULIP project

EES available for all 1,100 Elsevier Science journals

Publisher delivers:

TIFF images OCRed text SGML Bibliographic headers

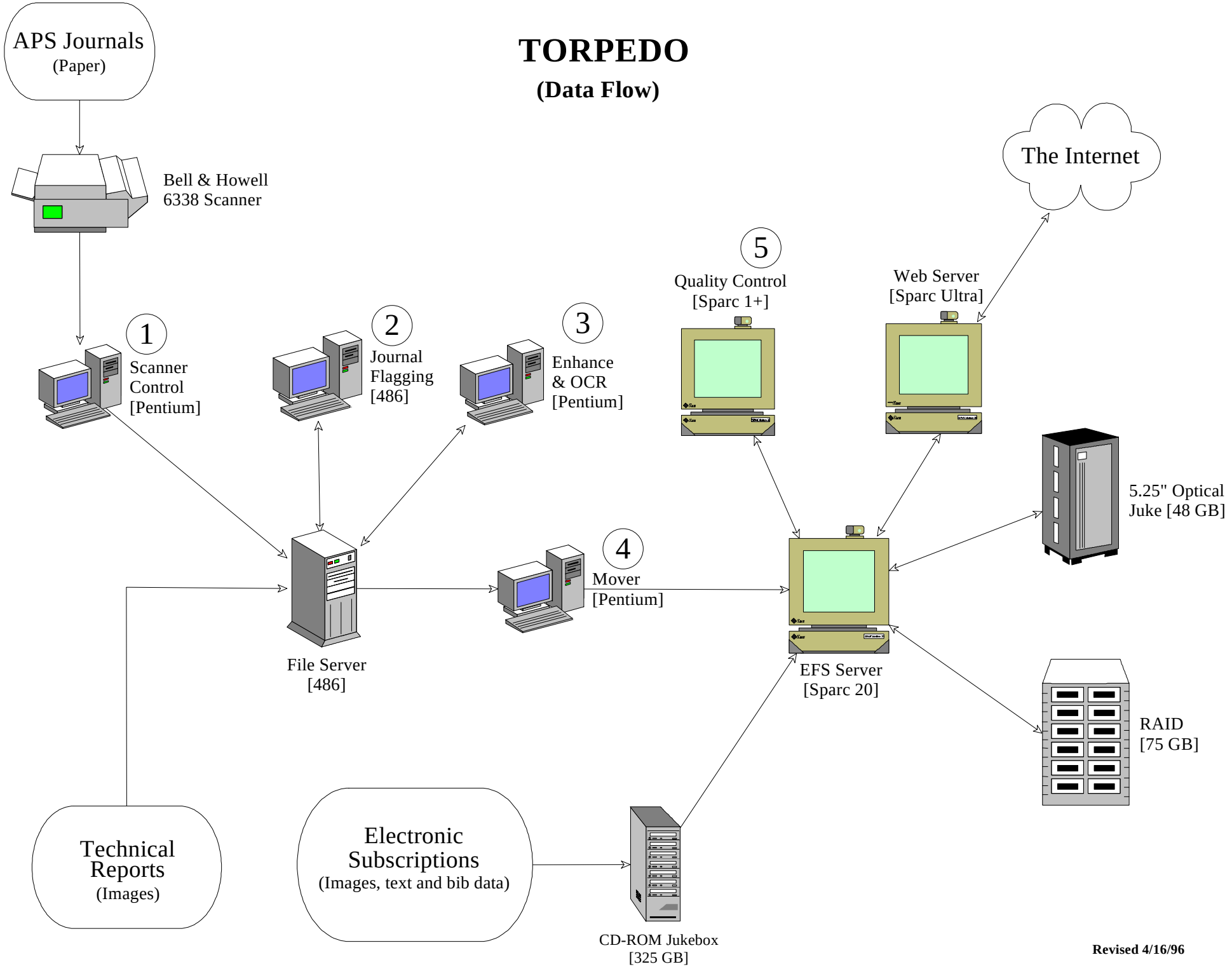
NRL implementation:

140 Journals Data delivered and retained on CD-ROM

Searchable with other information through TORPEDO

TORPEDO

(Data Flow)



Revised 4/16/96

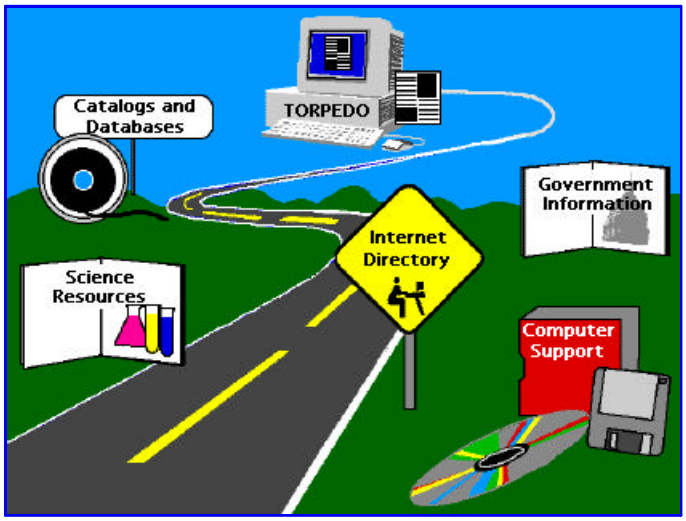
The Ruth H. Hooker Research Library

and Technical Information Center

Welcome to the Home Page of the Ruth H. Hooker Research Library and Technical Information Center of the Naval Research Laboratory.

We are looking for ways to improve TORPEDO. Please fill out our survey to voice your opinions. Survey responses will also be used by publishers in developing electronic journal products and demonstrate NRL/ONR interest in evaluating such services.

Search InfoWeb or check out the guideposts to notable new information sources.



- ☐ Catalogs and Databases
- ☐ Computer Support
- ☐ Government Information
- ☐ Internet Directory
- ☐ Science Resources
- ☐ TORPEDO

Ruth H. Hooker Research Library

and Technical Information Center

TORPEDO Journal Collection

[Search Collection | Online Help | Logout]

Fileroom

1 NRL Articles
2 NRL Press Releases
3 Technical Reports
4 Acta Astronautica
5 Acta Materialia
6 Analytica Chimica Acta
7 Applied Acoustics
8 Applied Radiation and Isotopes
9 Astroparticle Physics
10 Atmospheric Research
11 Bba-Bioenergetics
12 Bba-Biomembranes
13 Bba-Gene Structure and Expression
14 Bba-General Subjects
15 Bba-Lipids and Lipid Metabolism
16 Bba-Molecular Basis of Disease
17 Bba-Molecular Cell Research
18 Bba-Protein Structure and Molecular Enzymology

Display
103 cabinets

Ruth H. Hooker Research Library

and Technical Information Center

TORPEDO Search

[Modify Search Parameters | Browse Collection | Online Help | Logout]

Please enter your search terms in the clue field below:

Clue :

21 Hits Found -- Search Time: 00:00:02

#	Score	Page	Display Image	Display Image for Unix	Display Text	Whole Document	Preview Text
1	65536	1	tif	gif	Page 1337 (Fred Cooper,John F. Dawson,Dawn Meredith,Harvey Shepard)		RS @8 FEBRUARY 1904 **Semiquantum Chaos** Red Cooper,* John F. D
2	65536	1	tif	gif	Table of Contents		d K. Wiesenfeld 1333 **Semiquantum chaos** .....

Display

To perform a search across the entire TORPEDO collection, simply enter your search terms into the clue field above.

Semiquantum Chaos

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(Received 31 August 1993)

We consider a system in which a classical oscillator is interacting with a purely quantum mechanical oscillator, described by the Lagrangian $L = \frac{1}{2}\dot{x}^2 + \frac{1}{2}\dot{A}^2 - \frac{1}{2}(m^2 + e^2A^2)x^2$, where A is a classical variable and x is a quantum operator. With $\langle x(t)\rangle = 0$, the relevant variable for the quantum oscillator is $\langle x(t)x(t)\rangle = G(t)$. The classical Hamiltonian dynamics governing the variables $A(t)$, $\Pi_A(t)$, $G(t)$, and $\Pi_G(t)$ is chaotic so that the results of making measurements on the quantum system at later times are sensitive to initial conditions. This system arises as the zero momentum part of the problem of pair production of charged scalar particles by a strong external electric field.

PACS numbers: 05.45.+b, 03.65.Sq

The definition and observation of chaotic behavior in classical systems is familiar and well understood [1]. However, the proper definition of chaos for quantum systems and its experimental manifestations are still unclear [2]. Here we present a simple model of a coupled quantum-classical system and introduce a new phenomenon that we call semiquantum chaos. In a classical chaotic system such as the weather we are accustomed to situations where there is lack of long time forecasting because of the sensitivity of the system to initial conditions. The simple model we present here has the unusual feature that one has to give up long term forecasting even for the quantum mechanical probabilities, as exemplified by the average number of quanta at later times. The complete dynamics of the coupled quantum and classical oscillators is described by a classical effective Hamiltonian that is the expectation value of the quantum Hamiltonian. This effective Hamiltonian displays chaotic behavior, and thus the parameters that describe the quantum mechanical wave function (and hence expectation values) are sensitive to initial conditions. Chaos in dynamical systems with both quantum and classical degrees of freedom has been noted in more complicated systems and in a different context by other authors (see, e.g., [3]).

We consider a system in which a classical oscillator is interacting with a purely quantum mechanical oscillator described by the Lagrangian

$$L = \tfrac{1}{2}\dot{x}^2 + \tfrac{1}{2}\dot{A}^2 - \tfrac{1}{2}(m^2 + e^2A^2)x^2\,, \tag{1}$$

with equations of motion given by

$$\ddot{x} + (m^2 + e^2A^2)x = 0, \tag{2}$$

$$\ddot{A} + e^2x^2A = 0\,. \tag{3}$$

The Hamiltonian is

$$H = \tfrac{1}{2}p^2 + \tfrac{1}{2}\Pi_A^2 + \tfrac{1}{2}(m^2 + e^2A^2)x^2\,, \tag{4}$$

where $p(t) = \dot{x}(t)$ and $\Pi_A = \dot{A}(t)$. We take $x(t)$ to be a quantum operator and $A(t)$ to be the amplitude of the classical oscillator. We require $[x(t), p(t)] = i$. We now introduce time-independent Heisenberg representation creation and destruction operators, a and $a^\dagger$, by the ansatz

$$x(t) = f(t)\,a + f^*(t)\,a^\dagger\,, \tag{5}$$

and we note that if $f(t)$ satisfies the Wronskian condition

$$i[f^*(t)\dot{f}(t) - \dot{f}^*(t)f(t)] = 1\,, \tag{6}$$

then a and $a^\dagger$ satisfy the relation $[a, a^\dagger] = 1$. From (2) and (5), we find that $f(t)$ satisfies the equation of motion

$$\ddot{f} + (m^2 + e^2A^2)f = 0\,, \tag{7}$$

with the normalization fixed by the Wronskian condition (6). We can satisfy these two equations by the substitution

$$f(t) = \exp\left[-i\int_0^t \Omega(t')dt'\right] \Big/ \sqrt{2\Omega(t)}\,,$$

where $\Omega(t)$ satisfies the nonlinear differential equation

$$\frac{1}{2}\left(\frac{\ddot{\Omega}}{\Omega}\right) - \frac{3}{4}\left(\frac{\dot{\Omega}}{\Omega}\right)^2 + \Omega^2 = \omega^2\,, \tag{8}$$

with

$$\omega^2(t) \equiv m^2 + e^2A^2(t)\,. \tag{9}$$

Now, we choose the initial state vector at $t = 0$ to be the ground state of the operator $\hat{n} = a^\dagger a$, $|\Psi(0)\rangle = |0\rangle$, where $a|0\rangle = 0$. Then, from (5), the average (classical) value of $x(t)$ and $p(t)$ is 0 for all time, $\langle x(t)\rangle = 0$ and $\langle p(t)\rangle = 0$. However, the quantum fluctuations of $x(t)$ are nonzero and are given by the variable $G(t)$,

$$G(t) = \langle x^2(t)\rangle = |f(t)|^2 = \frac{1}{2\Omega(t)}\,. \tag{10}$$

Then, from (8), it is easy to show that $G(t)$ satisfies

$$\frac{1}{2}\left(\frac{\ddot{G}}{G}\right) - \frac{1}{4}\left(\frac{\dot{G}}{G}\right)^2 - \frac{1}{4G^2} + \omega^2 = 0\,. \tag{11}$$

InfoVision / 2000: Planning 21st Century Information Services

Study Team - named by the Director of Research

- NRL and ONR Researcher and Administrators
- Representatives from other Government agencies, Academia, Publishing community

Terms of Reference - NRL Library compiled

- Concept Paper outlining issues
- Vision, Mission, Goals, Objectives
- Background documentation covering:

Collections	Services	Systems	History
Staff	Library Bibliography	Statistics	Budget

Results: - met 5-9 February 96

- Endorsed Vision and Goals
- Recommended that the Library expand Web access to:
  - Databases and other information resources
  - Scientific journals that support NRL research

Expanding Web Access to Information Resources

Site Access to Databases Available on the Web

- FirstSearch available for 40+ databases since May
- Computer Select on Web replacing CD-ROM subscription
- Negotiations underway for other vendors

Mounting Commercial Databases Locally for NRL Use

- Material Safety Data Sheets - Replacing CD-ROM in October
- Other databases under consideration

Adding Databases to Web-based Catalog

- Database of NRL Publications
- Citation histories for NRL-authored Journal Articles

Making Library Resources Available via the Web

- Example: Online subscriptions to E-mail TOC
- ContentsToGo - Available for 900+ journals

Expanding Electronic Journal Access

Add new formats to TORPEDO, e.g PDF and SGML

- Position Library to work with more publishers
- Take advantage of electronic publication processes.

Provide site-licensed web access to publisher web sites

- Interim step for core journals
- Most useful when user has limited need for identified information.

Add journals from web publisher sites to TORPEDO

- Provide searching across entire electronic collection.
- Improve search and retrieval response time.
- Build an electronic archive for future agency use.

Virtual Library to Support Federal Researchers: Conclusion

Many Virtual Library services are available through InfoWeb!

InfoWeb delivers **targeted** information that the Library has:

- Selected for relevance and information content.
- Organized by category and/or discipline to facilitate access.
- Annotated to assist in selection and use.

Types of information include:

Catalogs *(Thomas Register, etc.)*

Bibliographic and Full-text Databases *(OCLC FirstSearch, etc.)*

Directories *(Nation-wide phone listings, etc.)*

And ***through TORPEDO*** desktop access to:

Full content of Library journals and reports